# JANOME DESKTOP ROBOT
# JR2000N Series

# Operation Manual
## Needle Adjuster 2

**Thank you for purchasing the Needle Adjuster 2 for the Janome desktop robot.**

- **Read this manual thoroughly in order to ensure proper use of this product. Be sure to read "Precautions" before use. The information will help you protect yourself and others from possible dangers during operation.**

- **After reading this manual, keep it in a handy place so that you or the operator can refer to it whenever necessary.**

**JANOME**

# PREFACE

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The slim and compact Janome Needle Adjuster 2 is equipped with two high-resolution light sensors. Simply install onto the Janome desktop robot JR2000N Series and update the PC software. The nozzle position can be adjusted automatically.

A replacement sensor board is available. If the sensor is damaged or gets dirty, contact the dealer from whom you purchased the robot or the office listed on the last page of this manual.

There are two types of Needle Adjuster 2 with different polarities, NPN or PNP. Check the specifications of your machine with reference to Page 15.

# ⚠ <u>Precautions</u>

- An extremely bent needle nozzle may not be detected by the sensor. Be careful not to damage the nozzle especially when using a thin needle nozzle.

- A permeable tapered nozzle (e.g. translucent silicon nozzle) may not be detected by the sensor. Even if it is detected, the result may not be accurate.

- **Before you use the Needle Adjuster 2, check that liquid is not dripping from the nozzle. If the sensor is damaged or gets dirty, the nozzle position cannot be detected precisely.**

- The Needle Adjuster 2 can only be used with the 3-Axis desktop robot.

- The Needle Adjuster 2 is equipped with infrared LEDs. Do not use the Needle Adjuster 2 in conjunction with an infrared heater. Infrared beam emitted from the heater may cause malfunction.

- Do not use the Needle Adjuster 2 in an environment where it is exposed to direct sunlight, or near lighting equipment or machines which emit infrared beam (heat rays), such as a tungsten lamp or electric stove. Sunlight and infrared beam may cause malfunction.

- The same nozzle position measuring program cannot be used for different types of needle nozzles. After you have replaced the nozzle, register the measuring points again or readjust the nozzle position using [XYZR Offset]*.

- If you wish to use the Needle Adjuster 2 with the existing program, adjust the nozzle position using [XYZR Offset]* first, and then register it as standard data. (See Page 7)

*: Refer to "Offset" ([Block Editing]) on Page 46 of *the Teaching and Operation* manual for details of [XYZR Offset].
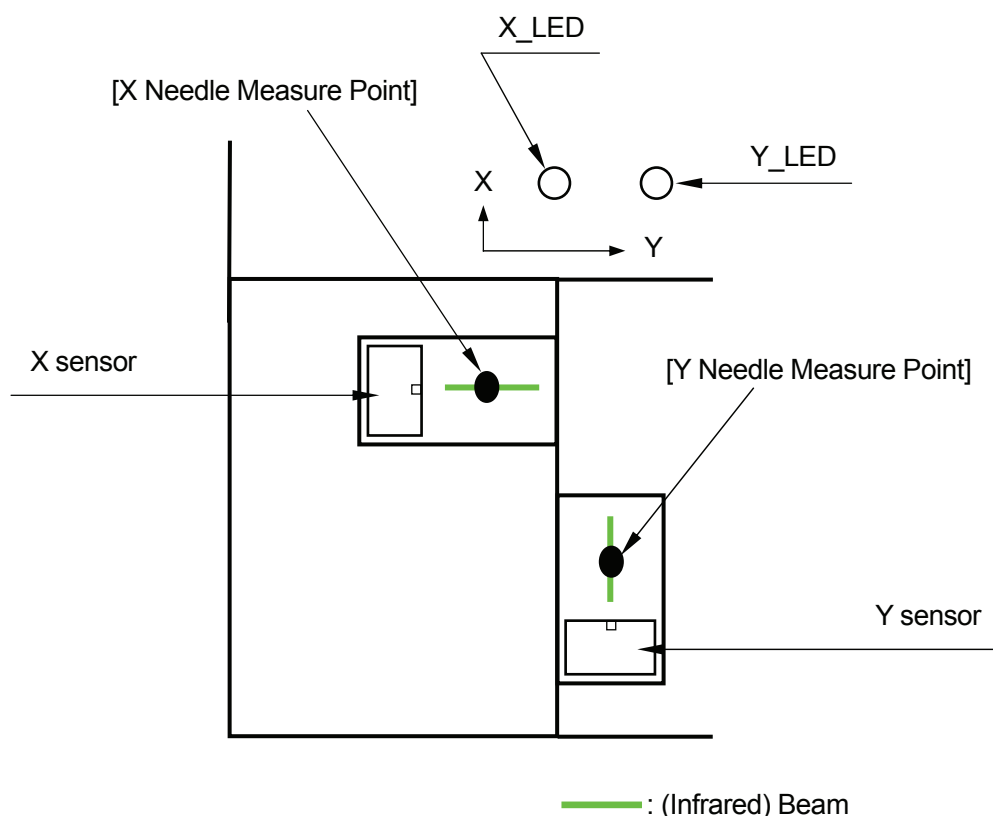
# CONTENTS

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# NEEDLE ADJUSTER 2 BASIC FEATURES

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Mount the Needle Adjuster 2 on the X table of the robot.

Register a program which contains only the two points indicated below and load the standard nozzle position data. Afterwards, the nozzle position can be adjusted automatically by running the program each time you change the nozzle.



———— : (Infrared) Beam

Register the two points, [X Needle Measure Point] and [Y Needle Measure Point], under an available program number.

The [X Needle Measure Point] is used to measure the nozzle position in the X-direction and the [Y Needle Measure Point] is used to measure the nozzle position in the Y-direction.

*Register the height of the nozzle tip at the measuring points and the standard positions in the X- and Y-directions in the Teaching mode menu.* (See Page 5) The tool data settings ([TCP-X], [TCP-Y], and [TCP-deltaZ]) are (0, 0, 0) when the standard positions have been registered.

Run the program after you have changed the nozzle. The robot compares the tip position of the new nozzle with the loaded (standard) nozzle position data, and then adjusts the nozzle position (rewrites the tool data) automatically.
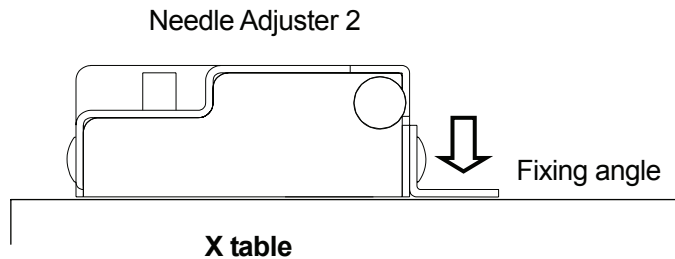
# INSTALLATION AND CONNECTION

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## Installation

Attach the fixing angle to the X table using two M4 screws.
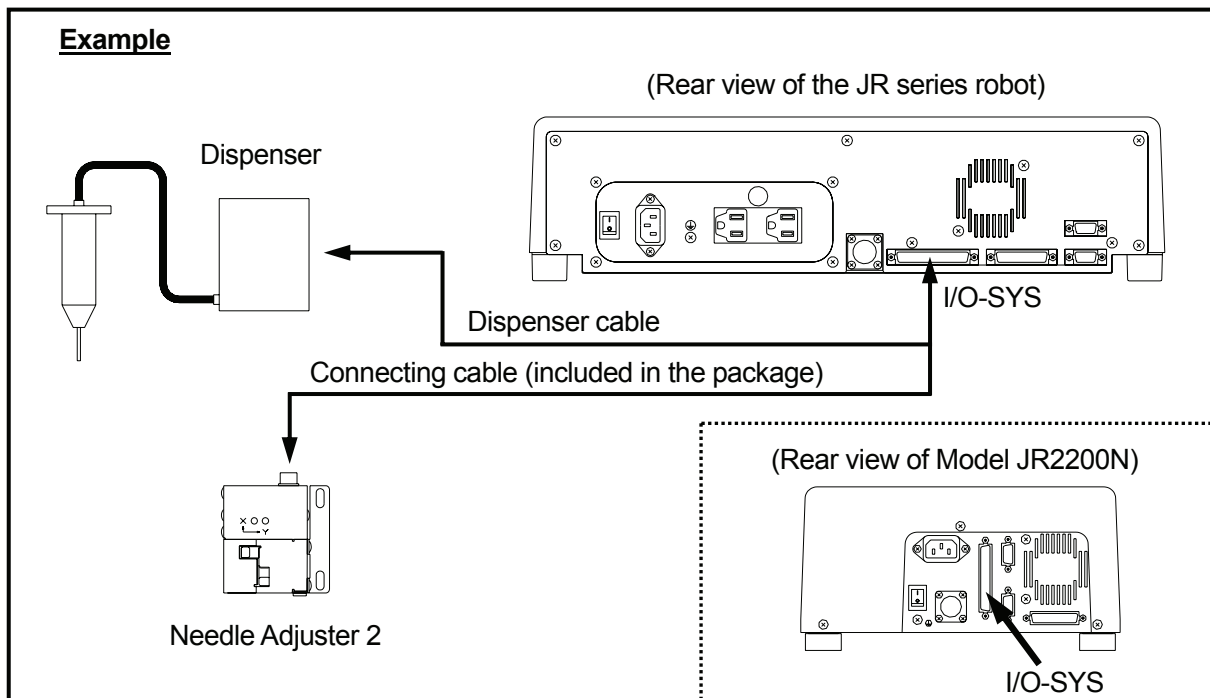
The M4 screws are not included in the package.

(See "EXTERNAL DIMENSIONS" on Pages 13 – 14 for further details)



Needle Adjuster 2

Fixing angle

**X table**

## Connection

Connect the Needle Adjuster 2 to I/O-SYS on the back of the robot using the connecting cable included in the package.

You can connect only one device to I/O-SYS on the robot at a time; however, using the I/O-SYS connector (robot accessory), you can connect the Needle Adjuster 2 and the dispenser at the same time to I/O-SYS on the robot.



**Example**

(Rear view of the JR series robot)

Dispenser

Dispenser cable

I/O-SYS

Connecting cable (included in the package)

(Rear view of Model JR2200N)

Needle Adjuster 2

I/O-SYS



**Be sure to turn off the robot when connecting cables.**

# HOW TO REGISTER THE MEASURING POINTS AND STANDARAD DATA

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## Procedures

Connect the Needle Adjuster 2 to the robot properly and set the nozzle in the same way as it is set during operation.

Next follow these three procedures to operate the Needle Adjuster 2:

1. Creating a new program
2. Point teaching
3. Registering standard data

## 1.   Creating a New Program

Open a new program.

Do not register the measuring points in programs that already contain other job points.

## 2.   Point Teaching

Register the first and the second points as the measuring points.

Register one [X Needle Measure Point] (to measure the nozzle position in the X-direction) and one [Y Needle Measure Point] (to measure the nozzle position in the Y-direction), in order of preference.

Register the measuring points at the height where the nozzle blocks the infrared beam. When it blocks the beam at the [X Needle Measure Point], the X_LED is turned off. At the [Y Needle Measure Point], the Y_LED is turned off.

### Setting Height Measurement

2.3mm

Sensor    (Note that this is just a reference value.)



: (Infrared) Beam
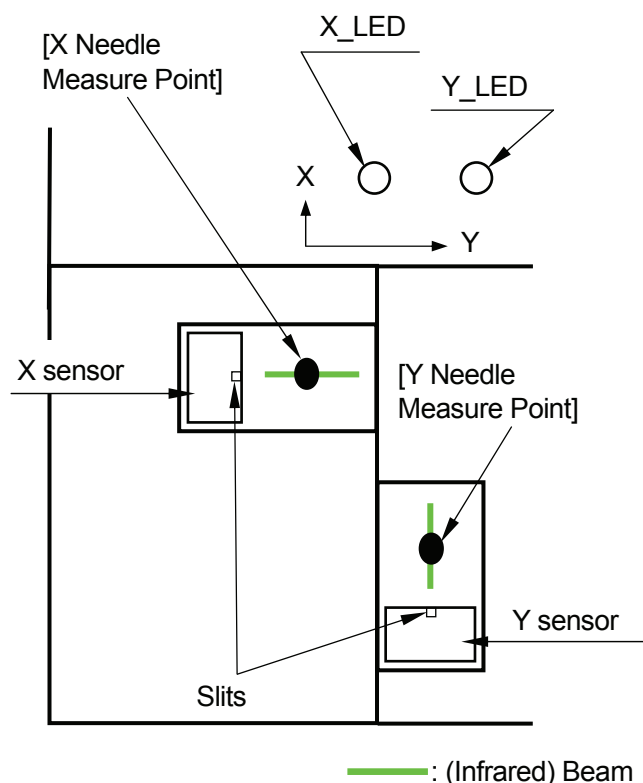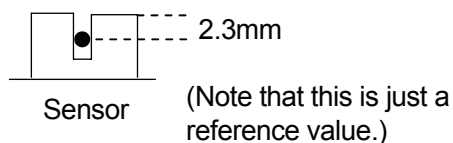
After you have entered the point coordinates, the Point Type selection screen will appear. Select [X Needle Measure Point] or [Y Needle Measure Point] on Page 2/2.

```
 Select  Point  Type        2/2
X  Needle  Measure  Point
Y  Needle  Measure  Point




```
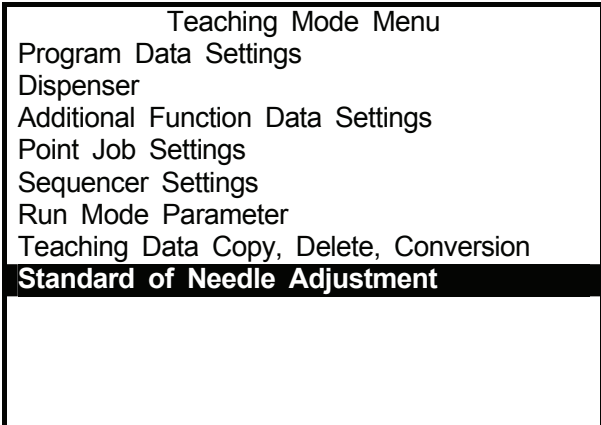
## 3. Registering Standard Data

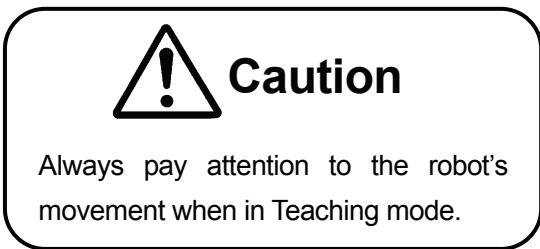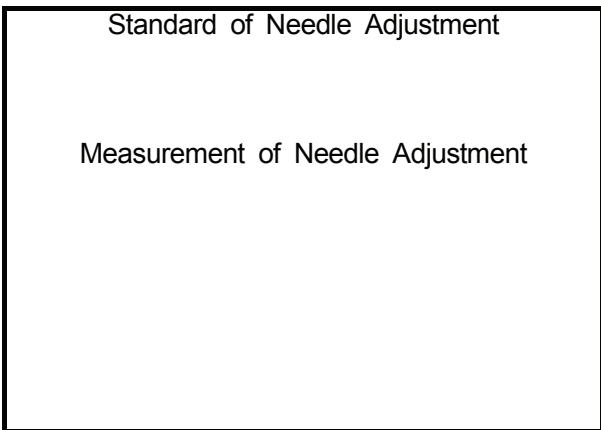After you have entered the measuring points, register the standard data.

The nozzle position error is adjusted according to the standard values set here.

Press the MENU key to display the Teaching Mode Menu screen.

Select [Standard of Needle Adjustment]. This item will appear on the Teaching Mode Menu screen only when the program that contains the needle measuring points is selected.

```
┌────────────────────────────────────────┐
│         Teaching Mode Menu             │
│ Program Data Settings                  │
│ Dispenser                              │
│ Additional Function Data Settings      │
│ Point Job Settings                     │
│ Sequencer Settings                     │
│ Run Mode Parameter                     │
│ Teaching Data Copy, Delete, Conversion │
│ ■Standard of Needle Adjustment■        │
│                                        │
│                                        │
└────────────────────────────────────────┘
```
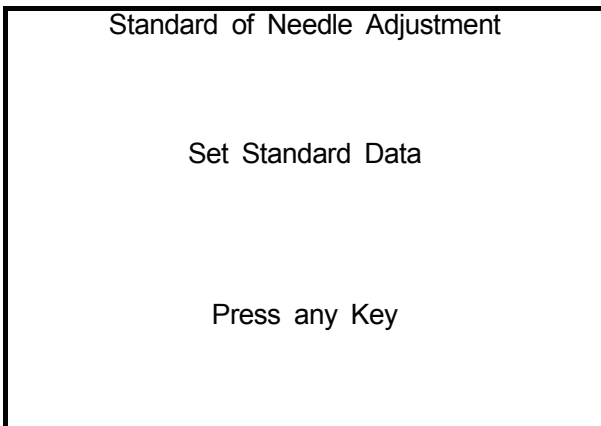
When [Standard of Needle Adjustment] is selected, the screen shown to the right will appear and the robot Arm will move to the registered measuring points.

```
┌────────────────────────────────────────┐
│      Standard of Needle Adjustment     │
│                                        │
│                                        │
│     Measurement of Needle Adjustment   │
│                                        │
│                                        │
│                                        │
│                                        │
│                                        │
│                                        │
└────────────────────────────────────────┘
```

⚠ **Caution**

Always pay attention to the robot's movement when in Teaching mode.

When the standard data registration is complete, the screen shown to the right will appear.

Press any key to return to the base screen.

```
┌────────────────────────────────────────┐
│      Standard of Needle Adjustment     │
│                                        │
│                                        │
│             Set Standard Data          │
│                                        │
│                                        │
│                                        │
│              Press any Key             │
│                                        │
│                                        │
└────────────────────────────────────────┘
```

# PROGRAM RUN

_____

After you have replaced the nozzle, run the program that contains the [X Needle Measure Point] and [Y Needle Measure Point] registered in the previous chapter.

The nozzle position error calculated according to the standard values set in [Standard of Needle Adjustment] is registered in tool data ([TCP-X], [TCP-Y], and [TCP-deltaZ]) in all the programs, excluding the program that contains the needle measuring points.

┌─────────────────────────────────────────────────────────────────────────────┐
│  ⚠ **Caution**     Do not touch any moving parts of the robot during operation.  │
└─────────────────────────────────────────────────────────────────────────────┘

- If the nozzle position is not measured properly at the [X Needle Measure Point] or [Y Needle Measure Point], Error No. 056 [Measurement of Needle Error] will be returned. Register the measuring points again. (See Page 5)

  If the error occurs repeatedly, the sensor board may be damaged. Replace the sensor board. (See Page 9)

- Values registered in tool data ([TCP-X], [TCP-Y], and [TCP-deltaZ]) for nozzle position adjustment using the Needle Adjuster 2 do not affect the [Point Tool Data Settings] in the [Additional Function Data Settings].

- If the measuring points are set near to the operating range limit (the origin or the maximum of the X- or Y-coordinates) of the robot, the point positions may not fall within the range limit and Error No. 007 [Position is out of range] may be returned due to the features of the Needle Adjuster 2. Do not set the measuring points near to the operating range limit of the robot when you use the Needle Adjuster 2.
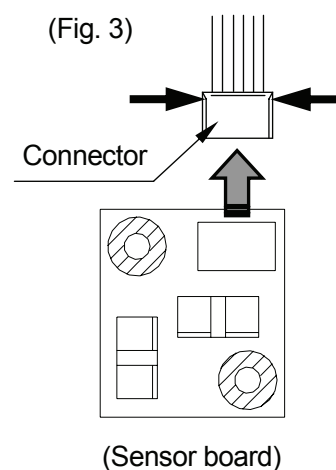
# HOW TO REPLACE THE SENSOR BOARD

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If the sensor gets dirty and cannot detect the nozzle position, replace the sensor board with the spare sensor board included in the package.

For extra sensor boards, contact the dealer from whom you purchased the robot or the office listed on the last page of this manual with reference to the specifications described on Page15.

(Fig. 1)    Sensor cover

*1

Sensor board

(Fig. 2)    Phillips screwdriver
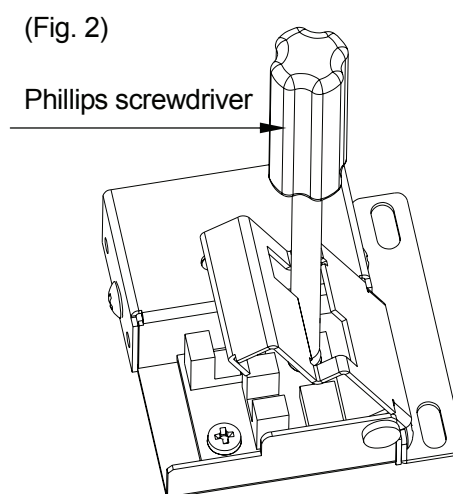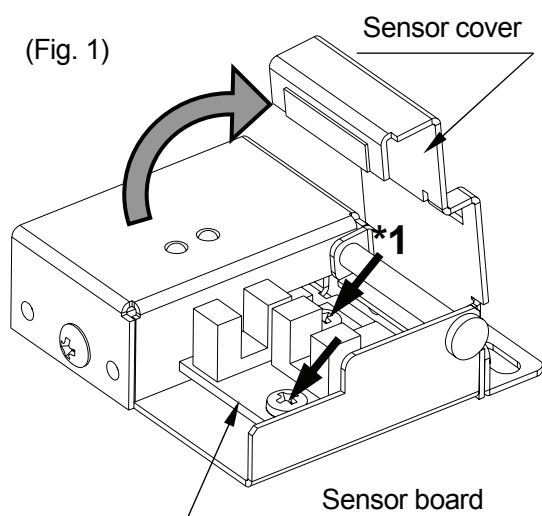
1.  Open the sensor cover, and then remove the two sensor board fixing screws indicated by the black arrows in Fig. 1.
    To remove the screw at the back (*1), insert a Phillips screwdriver into the hole in the sensor cover. (See Fig. 2)

2.  Remove the connector from the sensor board. Push up each side of the connector (indicated by the black arrows in Fig. 3) with your fingers and then pull it up.

3.  Connect the connector to the new sensor board.

4.  Secure the new sensor in the position indicated in Fig. 1 using the two fixing screws.

5.  Close the sensor cover.

(Fig. 3)

Connector

(Sensor board)

● After you have replaced the sensor board, be sure to register the measuring points again.

> **❗ Be sure to turn off the robot before beginning the replacement.**

# I/O FUNCTION ASSIGNMENT

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## I/O-SYS Function Assignment A (I/O-A)

| | | Name | Function | Pin No. |
|---|---|---|---|---|
| Input | Ext. | sysIn1 | Start | 1 |
| | | sysIn2 | Free/Start Inhibition/Stop-Start Inhibition/Soft Lock/Stop | 2 |
| | | sysIn3 | Program Number LOAD | 3 |
| | | sysIn4 | Program Number bit0   $2^0$=1 | 4 |
| | | sysIn5 | Program Number bit1   $2^1$=2 | 5 |
| | | sysIn6 | Program Number bit2   $2^2$=4 | 6 |
| | | sysIn7 | Program Number bit3   $2^3$=8 | 7 |
| | | sysIn8 | Program Number bit4   $2^4$=16 | 8 |
| | | sysIn9 | Program Number bit5   $2^5$=32 | 9 |
| | | sysIn10 | Program Number bit6   $2^6$=64 | 10 |
| | | sysIn11 | Last Work/Program Number bit7   $2^7$=128 | 11 |
| | | sysIn12 | Temporary Stop | 12 |
| | F | sysIn13 | Dispensor Response | 13 |
| | | sysIn14 | Free/Start Inhibition/Stop-Start Inhibition/Soft Lock/Stop | 14 |
| | F | sysIn15 | X Needle Sensor | 15 |
| | F | sysIn16 | Y Needle Sensor | 16 |
| Output | Ext. | sysOut1 | Ready for Start | 17 |
| | | sysOut2 | Robot Stopping | 18 |
| | | sysOut3 | Program Number ACK | 19 |
| | | sysOut4 | Program Number Error | 20 |
| | | sysOut5 | Running | 21 |
| | | sysOut6 | Error | 22 |
| | | sysOut7 | Emergency Stop | 23 |
| | | sysOut8 | Position Error | 24 |
| | | sysOut9 | Free | 25 |
| | F | sysOut10 | Dispensor ON | 26 |
| | | sysOut11 | Free | 27 |
| | | sysOut12 | Free | 28 |
| | | sysOut13 | Free | 29 |
| | | sysOut14 | Free | 30 |
| | | sysOut15 | Free | 31 |
| | | sysOut16 | Free | 32 |
| | | – | No connection | 33 |
| Others | | COM+ | DC24V | 34 |
| | | COM- | GND | 35 |
| | | COM- | GND | 36 |
| | | COM- | GND | 37 |

Ext: Activated only in the External Run mode.

F:   Previously set to [Free] in [IO-SYS Function Assignment] ([Run Mode Parameter] menu).

Can be changed (to I/O-1, for example) on the [IO Function Assignment] settings screen. (See Page 12)

The following signals are unique to the Needle Adjuster 2 features:

X Needle Sensor (sysln15):       This signal is always on except when the nozzle is at the [X Needle Measure Point] or blocks the beam from the X sensor (the X_LED is off).

Y Needle Sensor (sysln16):       This signal is always on except when the nozzle is at the [Y Needle Measure Point] or blocks the beam from the Y sensor (the Y_LED is off).

**Connecting Cables**

| (I/O-SYS) Pin No. | Name | Function | Connecting cables in the package | |
|---|---|---|---|---|
| | | | Color of insulator | Color of dot |
| 15 | sysln15 | X Needle Sensor | Orange | Red |
| 16 | sysln16 | Y Needle Sensor | Gray | Black |
| 34 | COM+ | DC24V | Orange | Black |
| 35 – 37 | COM- | GND | Gray | Red |
| – | – | – | White | – |
| – | – | – | White | – |

●   Use one of Pins 35 – 37 as the GND.

**Robot I/O-SYS Pin Nos.**
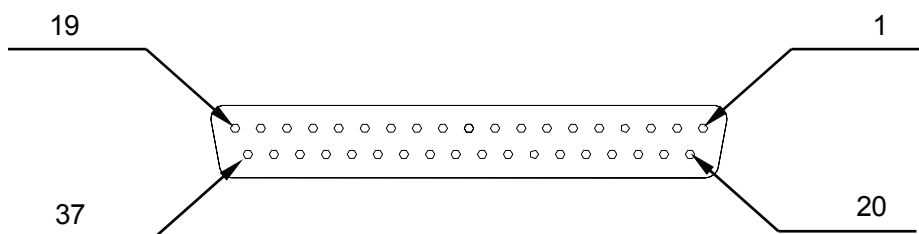
## How to Change the Signal Settings

The I/O-SYS signal #sysIn15 or #sysIn16 is turned off when the nozzle blocks the beam from the X sensor or Y sensor (the X_LED or Y_LED is off).

If these two signals are assigned to I/O-1, you can connect the Needle Adjuster 2 and the dispenser to the robot using two different connecting cables: I/O-1 for the Needle Adjuster 2 and I/O-SYS for the dispenser.

Press the ⏛MENU⏛ key in the Teaching mode to display the Teaching Mode Menu screen.
Select [Dispenser].

```
          Teaching  Mode  Menu
Program  Data  Settings
Dispenser
Additional  Function  Data  Settings
Point  Job  Settings
Sequencer  Settings
Run  Mode  Parameter
Teaching  Data  Copy,  Delete,  Conversion



```

Select [IO Function Assignment] from the Dispenser menu screen to display the I/O signal selection screen shown to the right.

Select the item you wish to change the connector or the pin number of.

```
          IO  Function  Assignment
Dispensor  ON              #sysOut10
Dispensor  Response        #sysIn13
X  Needle  Sensor          #sysIn15
Y  Needle  Sensor          #sysIn16



```

- Only the signals which are set to [Free] in [IO-SYS Function Assignment] ([Run Mode Parameter] menu) can be selected here. (See Page 10)
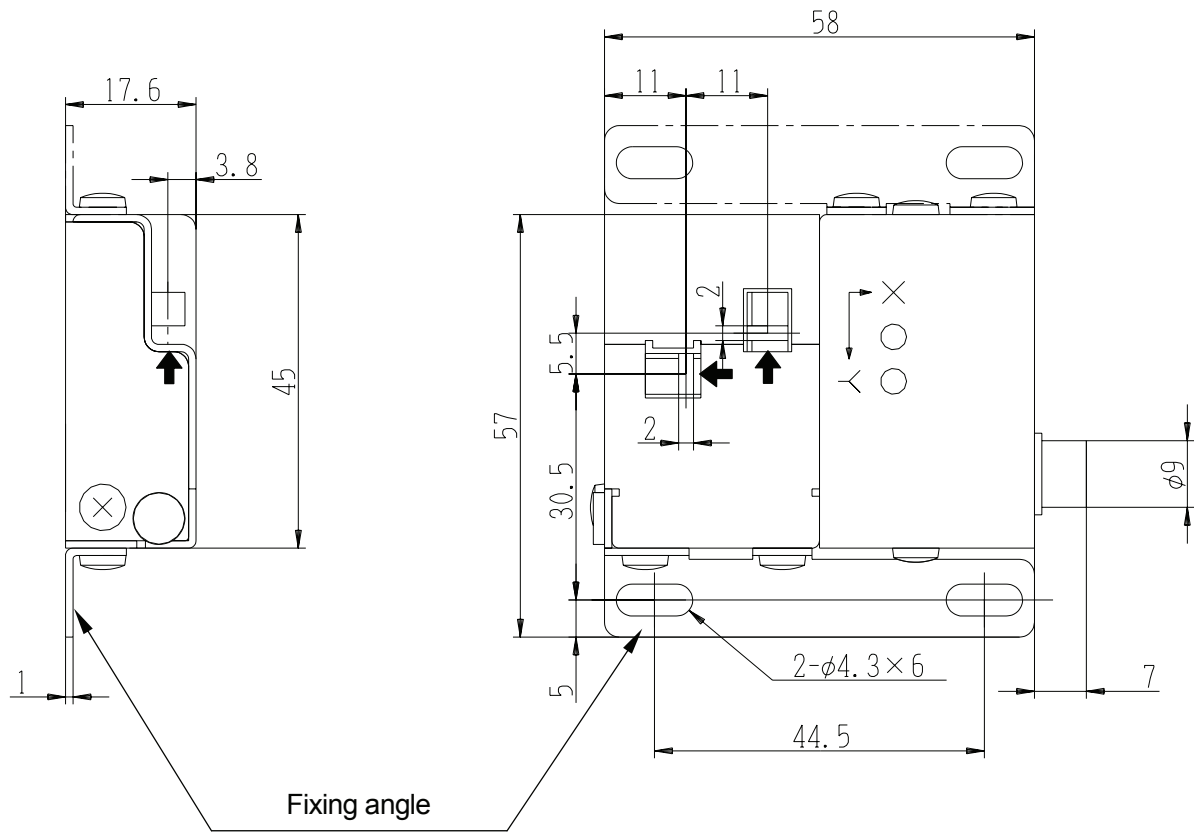
# EXTERNAL DIMENSIONS

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Needle Adjuster 2 (Standard: PR-1)

(Dimensions in millimeters)
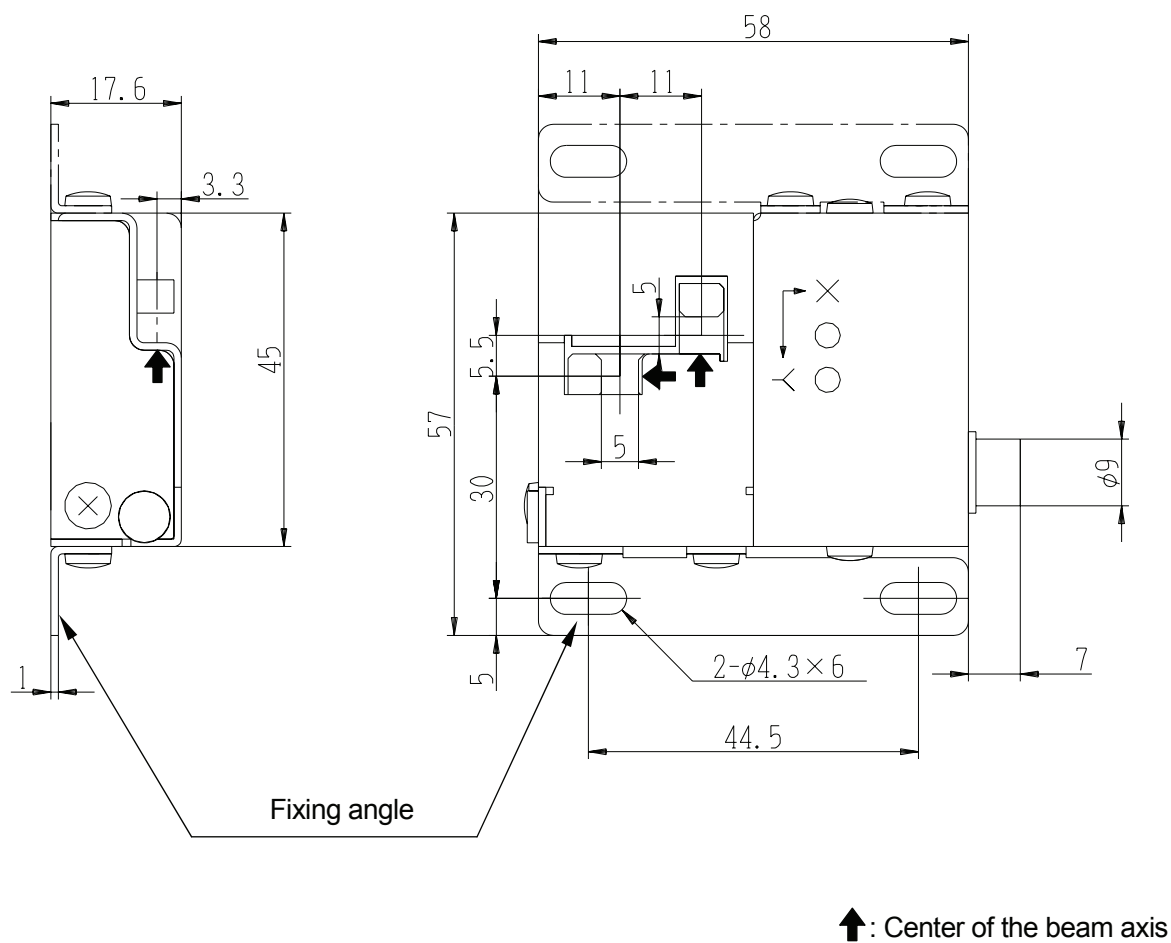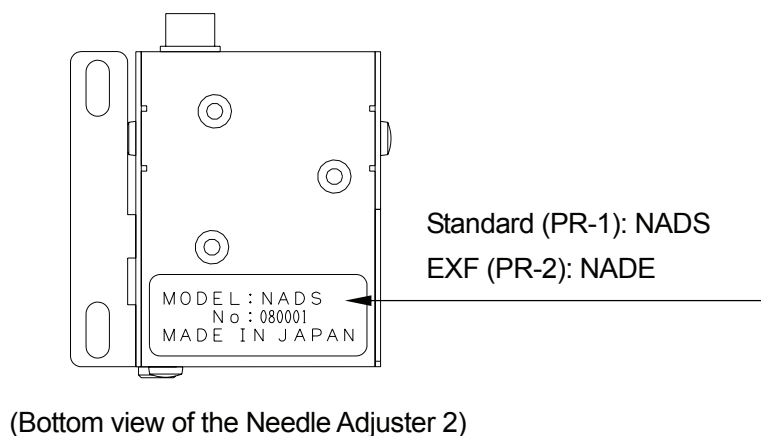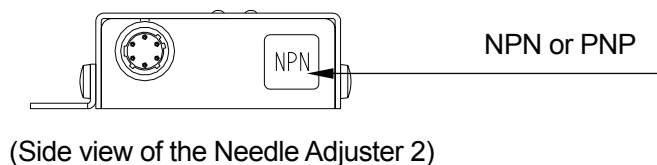


Fixing angle

↑ : Center of the beam axis

- You can attach the fixing angle to the opposite side of the body (dotted line position in the upper-right illustration).

  When changing the position of the fixing angle, use two screws used to attach it to the Needle Adjuster 2 or equivalent (M3x3). Screws longer than specified may damage the inside of the body.

Needle Adjuster 2 (EXF: PR-2)

(Dimensions in millimeters)



↑: Center of the beam axis

Fixing angle

- You can attach the fixing angle to the opposite side of the body (dotted line position in the upper-right illustration).
  When changing the position of the fixing angle, use two screws used to attach it to the Needle Adjuster 2 or equivalent (M3x3). Screws longer than specified may damage the inside of the body.

# SPECIFICATIONS

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| Item | Specifications |
|---|---|
| External dimensions | 58×45×17.6mm (Without connector) |
| Weight | 90g |
| Nozzle size | Standard (PR-1): 14 – 27Gage (Outer diameter: $\phi$0.35 – 2.5mm)<br>EXF (PR-2): 20 – 32Gage (Outer diameter: $\phi$0.2 – 1.0mm)<br><br>● Needle or tapered nozzle only. Infrared-transparent material or a nozzle with an extremely bent tip cannot be used. |
| Connection to the robot | I/O-SYS connection (using the robot cable) |

For extra sensor boards (Part Nos. 963576004: Standard (PR-1) and 963577005: EXF (PR-2)), contact the dealer from whom you purchased the robot or the office listed on the last page of this manual.

Note that the specifications of the sensor board should be the same as those of the Needle Adjuster 2. Check the specifications of the Needle Adjuster 2 you are using with reference to the stickers affixed to the body.



NPN or PNP

(Side view of the Needle Adjuster 2)



Standard (PR-1): NADS

EXF (PR-2): NADE

MODEL: NADS
No: 080001
MADE IN JAPAN

(Bottom view of the Needle Adjuster 2)

**MEMO**

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